



In-Flight Lab Analysis Technology Demonstration in Reduced Gravity

Problem Statement

- The loss of biosample return due to Space Shuttle retirement has directly led to a major risk for the Human Research Program (HRP): lack of in-flight lab analysis on ISS. To mitigate this risk, a robust, miniaturized biomedical analysis device is being sought by HRP..
- Comparison of inflight device performance of 4 candidate technologies would aid in the downselect for ISS usage. Likely commercial applications for hospitals, paramedics, home health monitoring and the the US military.

Technology Development Team

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- Funding supported by NASA Glenn Research Center, Cleveland, OH 44135-3127.
- Partnering organizations: ZIN, Nanomix, DNA Medicine Institute, Inc., Opko Health, and McDevitt Laboratory.



McDevitt Laboratory bios



OPKO



THE DNA MEDICINE INSTITUTE



nanomix

Proposed Flight Experiment

Experiment Readiness:

- The hardware is operationally ready for flight but test protocols need to be developed to segment the test sequence into meaningful 20-second periods. Readiness is likely Q3 of FY13

Test Vehicles:

- The requested platform is a parabolic aircraft flight.

Test Environment:

- An early generation of the DMI device has flown on a previous parabolic flight. The other three devices under evaluation have never flown nor requested a flight opportunity.

Test Apparatus Description:

- The parabolic flight tests would use handheld devices from up to four companies performing a set of standard diagnostics with the evaluation of the assays: TNF- α , NTx, IFN- γ , and Vitamin D (25-OH).

Technology Maturation

- Each of the four companies' devices are at a TRL 4.
- Data from a parabolic flight will aid in advancing these devices to TRL 6 through evaluation of microfluidic behavior and sample analysis.
- A parabolic flight in Q3/Q4 of FY13 would be beneficial in gaining data on each of the four candidate technologies in micro gravity to aid in the down select to a single device. A Q2 flight would be hard to meet..

Objective of Proposed Experiment

- Assessment of microfluidic behavior and analysis of assays for each commercial device.
- The expected flight data will be used to advance the technology development effort of the down selected device that will eventually become an In-Flight Lab Analysis Technology for the ISS and possibly exploration missions.